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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/671,851

09/26/2003

Melvin Robert Jackson

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7590

11/28/2006

GENERAL ELECTRIC COMPANY
GLOBAL RESEARCH
PATENT DOCKET RM. BLDG. K1-4A59
NISKAYUNA, NY 12309

EXAMINER

ROE, JESSEE RANDALL

ART UNIT

PAPER NUMBER

1742

DATE MAILED: 11/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/671,851

Applicant(s)

JACKSON ET AL.

Examiner

Jessee Roe

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 September 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3,5-21,23,25 and 27-43 is/are pending in the application.
- 4a) Of the above claim(s) 22 and 24 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3,5-21,23,25 and 27-43 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Status of Claims

Claims 1, 3, 5-21, 23, 25, and 27-43 are currently under examination wherein claims 2, 4, 24, and 26 are canceled; claims 1 and 23 are amended; and claims 22 and 44 are withdrawn from consideration.

Double Patenting

Applicant is advised that should claims 1, 3, 5-21 be found allowable, claims 23, 25, 27-43 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. In the absence of clear definitions within the specification that indicate the difference between an "article" and a "composite", these terms are treated as being interchangeable. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 3, 5-9, 12-17, 23, 25, and 27-39 are rejected under 35 U.S.C. 103(a)

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as being unpatentable over Xu et al. (US 6,692,586).

In regards to claims 1, 3, 5, 12-13, 15-16, 23, 25, 27, 34-35, 37-38, Xu et al. ('586) disclose a method for forming a refractory metal-intermetallic composite comprising a first metal powder comprised of niobium, titanium, and hafnium (col. 3, lines 1-35). Xu et al. ('586) disclose a second metal powder comprised of silicon, chromium, and aluminum (col. 3, lines 1-35). Xu et al. ('586) disclose blending the alloy powders (See Example 8). Xu et al. ('586) disclose pulverizing and pressing the composition (foil, ingot, powder, slurry, button slug) in a ball mill (consolidating and mechanical deformation) (cols. 4 and 7). However, there is no temperature limitation indicated for the pulverizing or pressing. Therefore, one of ordinary skill in the art would assume that pulverizing or pressing would take place at any temperature up to and including 1500 °C. Xu et al. ('586) disclose reacting the powder blend at a temperature 1200-1500 °C then exposing the powder to a temperature 1100-1425 °C (col. 8, line 55-col. 9, line 20). This overlaps the temperature limitations of the claimed invention.

The Examiner notes that the disclosed temperature constraints overlap with the temperature limitations of the claimed invention. Therefore, a prima facie case of obviousness exists. See MPEP 2144.05 I. It would have been obvious to one of ordinary skill in the art at the time the invention was made to select a final reaction temperature higher than that of the initial reaction temperature as disclosed by Xu ('586) because Xu ('586) teaches the same method throughout the disclosed temperature limitations.

In regards to claim 6 and 28, Xu et al. ('586) disclose a method for forming a

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refractory metal-intermetallic composite comprising a first metal powder comprised of niobium, titanium, and hafnium (col. 3, lines 1-35). Xu et al. ('586) disclose a second metal powder comprised of silicon, chromium, and aluminum (col. 3, lines 1-35). Xu et al. ('586) disclose pulverizing and pressing the composition (foil, ingot, powder, slurry, button slug) in a ball mill (consolidating and mechanical deformation) (cols. 4 and 7). After heating, it would be expected that silicon, chromium, aluminum, niobium, titanium, and hafnium would comprise the refractory metal-intermetallic composite.

In regards to claims 7-8 and 29-30, Xu et al. ('586) disclose a method for forming a refractory metal-intermetallic composite comprising a first metal powder comprised of: 45-91.5 weight percent titanium; 0.01-43.5 weight percent chromium; 0.01-71.5 weight percent silicon; and 0.01-74.5 weight percent niobium. Xu et al. ('586) disclose a second metal powder comprised of: 0.01-91.5 weight percent titanium; 0.01-98.3 weight percent niobium; 0.01-43.5 weight percent chromium; 0.01-89.5 weight percent hafnium; and 0.01-71.5 weight percent silicon (see claim 1). It would be expected that with the flexibility of the powder compositions, one of ordinary skill in the art could manipulate the mixture to form a refractory metal-intermetallic composite comprising 15-30 atomic percent titanium, 1-8 atomic percent hafnium, 5-25 atomic percent silicon, 1-14 atomic percent chromium, and balance niobium. For the elements germanium, boron, iron, aluminum, tin, tungsten, and molybdenum, due to the claimed language of "up to", these elements may be absent in the claimed powder composition. See MPEP 2144.05 II.

In regards to claim 9 and 31, Xu et al. ('586) disclose a method for forming a

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refractory metal-intermetallic composite comprising a first metal comprised of: 0.01-71.5 weight percent silicon; 0.01-53.5 weight percent germanium; 45-91.5 weight percent titanium; and 0.01-2.25 weight percent boron. Xu et al. ('586) disclose a second metal powder comprised of: 0.01-91.5 weight percent titanium and 0.01-43.5 weight percent chromium. When titanium is in the form of an ore, it is accompanied by iron and oxygen in minerals such as rutile, ilmenite, and sphene to name a few. It would be expected that with the flexibility of the powder composition, one of ordinary skill in the art could manipulate the composition to form a refractory metal-intermetallic composite comprising 5-25 atomic percent of silicon, germanium, and boron and 1-18 atomic percent of iron and chromium. See MPEP 2144.05 II.

In regards to claim 14 and 36, Xu et al. ('586) disclose a method for forming a refractory metal-intermetallic composite comprised of maintaining a heating temperature for 15 minutes (See Example 2 and col. 8, line 45- col. 9, line 20). This overlaps the claimed time of heating limitation of less than about 2 hours. Therefore, a prima facie case of obviousness exists. See MPEP 2144.05 I.

In regards to claim 17 and 39, Xu et al. ('586) disclose a method for forming a refractory metal-intermetallic composite comprised of maintaining a second heating temperature for between 1-100 hours (col. 9, lines 1-20). This overlaps the claimed time of heating limitation of more than about 4 hours. Therefore, a prima facie case of obviousness exists. See MPEP 2144.05 I.

Claims 10-11 and 32-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Xu et al. (US 6,692,586) in view of Svedberg et al. (US 4,836,849).

In regards to claims 10-11 and 32-33, Xu et al. ('586) meet the method claim limitations as shown above, but Xu et al. (586) do not disclose a technique selected from the group consisting of cold isostatic pressing, hot isostatic pressing, hot pressing, explosive consolidation, magnetic pulse consolidation, ram pre-extrusion consolidation, hot forging, hot swaging, and hot extrusion.

Svedberg et al. ('849) disclose a method of forming a niobium based refractory metal-intermetallic composite utilizing a technique selected from hot rolling, hot isostatic pressing, cold pressing, and hot pressing (col. 3, lines 1-50). The resulting shape is useful in applications such as turbine blades, combustors, and nozzles of jet engines that require high strength at high temperature in the presence of oxygen (col. 3, lines 1-50).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate a technique selected from hot isostatic pressing, cold pressing, and hot pressing, as disclosed by Svedberg et al. ('849), into the method of forming a metal-intermetallic compound, as disclosed by Xu et al. ('586), in order to obtain a resulting shape that is useful in applications such as turbine blades, combustors, and nozzles of jet engines that require high strength at high temperature in the presence of oxygen, as disclosed by Svedberg et al. ('849) (col. 3, lines 1-50).

Claims 18-20 and 40-42, are rejected under 35 U.S.C. 103(a) as being unpatentable over Xu et al. (US 6,692,586) in view of Jackson et al. (US 6,428,910).

In regards to claims 18-20 and 40-42, Xu et al. ('586) meet the method claim limitations as shown above, but Xu et al. (586) do not disclose a refractory metal-

intermetallic composite with a graded composition.

Jackson et al. ('910) disclose a niobium based refractory metal-intermetallic with a graded surface composition (col. 4, lines 25-68). The surface layer and the core could be subjected to the same surface treatment (i.e. grading, electron beam evaporation, and vacuum ion plasma deposition) (col. 3, line 32-col. 5, line 10). A graded composition provides oxidation resistance throughout turbine operation (col. 4, lines 25-68).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of forming a refractory metal-intermetallic composite, as disclosed by Xu et al.('586), to create a graded composition, as disclosed by Jackson et al. ('910), in order to provide oxidation resistance throughout turbine operation, as disclosed by Jackson et al. ('910) (col. 4, lines 25-68).

Claims 19-21 and 41-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Xu et al. (US 6,692,586) in view of Svedberg et al. (US 4,836,849).

In regards to claims 19-21 and 41-43, Xu et al. ('586) meet the method claim limitations as shown above, but Xu et al. ('586) do not disclose a refractory metal-intermetallic composite with an environmentally-resistant/thermal coating.

Svedberg et al. ('849) disclose an oxidation resistant coating for a niobium based composite containing Cr, Ti, Al, and/or B; aluminides containing Cr, FeB, SiO₂, Fe, Ni, and/or Si; or noble metal coatings containing Pt, Rh, Hf, and/or Ir (col. 3). These coatings provide an oxidation resistance (environmentally-resistant) coating (col. 3). It would be expected that any type of coating would provide a thermal barrier to

the external environment.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of forming a refractory metal-intermetallic composite, as disclosed by Xu et al.('586), to add a coating, as disclosed by Svedberg et al. ('849), in order to obtain a surface that is resistant to oxidation, as disclosed by Svedberg et al. ('849) (col. 3).

Response to Arguments/Amendment

Applicant's arguments filed 19 September 2006 with respect to claims 1, 3, 5-21, 23, 25, 27-43 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP §706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR1.136(a). A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory

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action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jessee Roe whose telephone number is (571) 272-5938. The examiner can normally be reached on Monday-Friday 8 AM - 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JR


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